

Application Number 10/521531  
Response to the Office Action dated March 30, 2009

### REMARKS

Favorable reconsideration of this application is requested in view of the following remarks.

With respect to the filing receipt issued on July 30, 2007, Applicants respectfully request to correct the filing date of the present application to be March 16, 2006, the date on which "Submission of Missing Requirements, Notification of Missing Requirements, Submission of Signed Combined Declaration and Power of Attorney, Change of Address" were filed, instead of February 22, 2007, and correct the filing date in the Office Action accordingly. A courtesy copy of the filing receipt and the above documents submitted on March 16, 2006 is attached herewith for the Examiner's convenience.

Claim 1 has been amended to include the limitations of claim 5 as suggested in the Office Action mailed on March 30, 2009, and further amended to exclude deuterium peroxide ( $D_2O_2$ ) from the deuterated solvent as supported by the specification at page 2, second paragraph and examples of claim 1, which use  $D_2O$  only as the heavy hydrogen source (see example 1 on pages 27-28 and examples 2-16 on page 28). The specification indicates that heavy hydrogen peroxide is not suitable for aromatic compounds such as those listed in claim 1 (see page 2, first and second paragraphs at lines 3-15). Moreover, examples 1-16 do not use  $D_2O_2$  (see pages 27-28). Accordingly, claim 1 is supported by the specification. Claim 5 has been canceled without prejudice, and claims 7-9 have been amended editorially.

Claim 11 has been added as supported by the specification at page 15, line 36 – page 16, line 19).

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Claims 1-5 have been rejected under 35 U.S.C. 112, first paragraph, as not complying with the enablement requirement. Applicants respectfully traverse this rejection.

Claim 1 has been amended to include the aromatic rings listed in previously presented claim 5 as suggested in the Office Action mailed March 30, 2009. Accordingly, this rejection should be withdrawn.

Claims 1-5 and 7-10 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Dinh-Nguyen et al. (U.K. Patent No. 1,103,607) or Junk et al. ("Preparative supercritical deuterium exchange in arenas and heteroarenes", Tetrahedron Letters, Vol. 37, No. 20, pp. 3445-3448, 1996) (Junk (I)) in view of Junk et al. (U.S. Patent No. 5,830,763) (Junk (II)) or Bergman et al. (U.S. Patent No. 6,794,522). Applicants respectfully traverse this rejection.

Dinh-Nguyen discloses a deuteration method of organic compounds in the presence of an alkaline deuteroxide, a platinum catalyst, and deuterium peroxide ( $D_2O_2$ ) (see page 1, left coln. lines 38-45). Junk (II) refers to Hsiao et al. ("Preparation of Fully Deuterated Fatty Acids by Simple Method", American Oil Chemists' Society, Lipids, 9(11), 913-915, 1974), which discloses a deuteration method of a saturated straight chain fatty acid such as caproic, caprylic, capric lauric, or myristic acid (see page 913, left coln., "Introduction", right coln., first para., and page 914, right coln., second para. under "Results and discussion") and fails to disclose a deuteration method of aromatic ring as claim 1 requires. Hsiao further discloses that the deuteration method under the neutral condition needs several days to complete exchange of deuterium for hydrogen (see page 914, first para. under "Results and discussion"). Junk (II) also discloses that diphenyl amine is partially deuterated under the neutral condition and needs the second supercritical deuteration (see example 1 in coln. 6) but that the compounds are successfully deuterated with calcium oxide, i.e., under an alkali condition, or with  $[d_3]$ phosphoric acid, i.e., under an acidic condition (see examples 2 and 3 in coln. 6, respectively). Considering the necessary period of several days for deuteration under the neutral condition taught by Hsiao, in addition to the difference between the aromatic ring

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compounds of claim 1 and the saturated straight chain fatty acid of Hsiao, and the examples of Junk (II), in which the deuteration method under the neutral condition needs the second deuteration process, there is no reasonable basis to combine Dinh-Nguyen with Junk (II) or Hsiao and perform the deuteration reaction under the neutral condition.

Bergman merely discloses that an H/D exchange occurs under moderate conditions, i.e., neutral conditions (see coln. 2, lines 45-46 and coln. 5, lines 12-14). However, an aromatic ring compound, which is deuterated in Bergman, is benzoic acid (see coln. 8), a solution of which is acidic. Other compounds to be deuterated that Bergman discloses are tetrahydrofuran, diethyl ether, and n-propanol (see examples 1-15 in colns. 8-11), and Bergman fails to disclose a method of reacting the aromatic ring compounds listed in claim 1 under a neutral condition as claim 1 requires. Thus, there is no reasonable basis to combine Dinh-Nguyen with Bergman to obtain the neutral condition.

Further, Dinh-Nguyen discloses that by the conventional deuteration method using heavy water ( $D_2O$ ) in the presence of an alkali and a platinum catalyst, a sufficient replacement of hydrogen by deuterium in high molecular weight compounds such as organic compounds cannot be achieved (see *id.* at line 14-29). Thus, even if Dinh-Nguyen were combined with Junk (II) or Hsiao or Bergman and performs the deuteration under the neutral condition, which Applicants do not concede, Dinh-Nguyen motivates those skilled in the art to use  $D_2O_2$  as a deuterated solvent for deuteration of listed aromatic ring compounds and does not suggest excluding  $D_2O_2$  from the deuterated solvent, i.e., a deuterium source, for deuteration of the aromatic compounds listed in claim 1 as claim 1 requires.

Junk (I) discloses a deuteration method of using deuterium oxide ( $D_2O$ ) and sodium deuterioxide ( $NaOD$ ) solution (see page 3445, third paragraph), i.e., a deuteration method under an alkaline condition. As discussed above, Junk (II), Hsiao, and Bergman merely suggest the neutral condition, and the disclosed method of the neutral condition for deuteration would not be considered a realistic option for deuteration of the aromatic ring compounds for the reasons discussed above. Therefore, there is not reasonable basis to combine Junk (I) with Junk (II), Hsiao, and Bergman and perform deuteration under

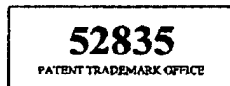
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the neutral condition for at least the same reasons as discussed for Dinh-Nguyen regarding the neutral condition above.

Accordingly, claim 1 and claims 2-4, 7-11, which ultimately depend from claim 1, are distinguished from Dinh-Nguyen or Junk (I) in view of Junk (II) or Bergman, and this rejection should be withdrawn.

In view of the above, Applicants request reconsideration of the application in the form of a Notice of Allowance.

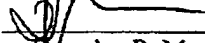


Dated: June 30, 2009

DPM/my/jls

Respectfully submitted,

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**JUN 30 2009**



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APPL NO.	FILING OR 371(c) DATE	ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLMS	IND CLMS
10/521,531	02/22/2007	1754	1030	14633.0006USWO	6	2

**CONFIRMATION NO. 1839**

52835

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**FILING RECEIPT**



\*OC000000025007876\*

Date Mailed: 07/30/2007

Receipt is acknowledged of this nonprovisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please write to the Office of Initial Patent Examination's Filing Receipt Corrections. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections (if appropriate).

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**Assignment For Published Patent Application**

Wako Pure Chemical Industries, Ltd., Osaka, JAPAN

**Power of Attorney:** The patent practitioners associated with Customer Number 52835.

**Domestic Priority data as claimed by applicant**

This application is a 371 of PCT/JP03/08783 07/10/2003

**Foreign Applications**

JAPAN 2002-219005 07/26/2002

**If Required, Foreign Filing License Granted:** 07/24/2007

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US10/521,531**

**Projected Publication Date:** 11/01/2007

**SCANNED**

✓D

Non-Publication Request: No

Early Publication Request: No

**Title**

Method for Deuteration of an Aromatic Ring

**Preliminary Class**

502

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